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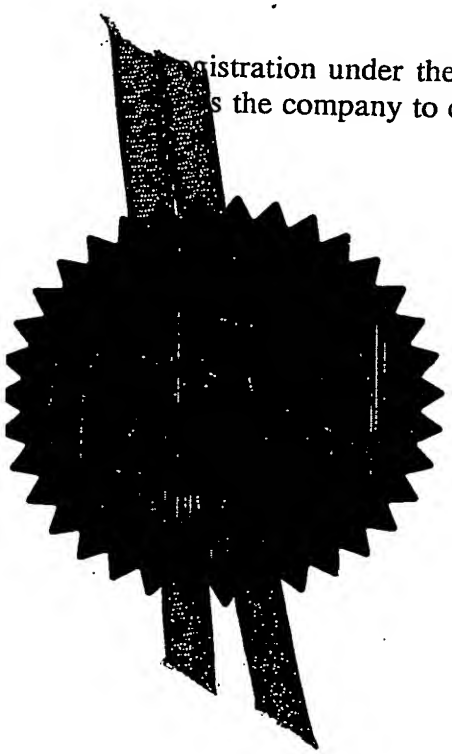

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1. Your reference
C921/H

2. Patent application number
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0403650.5

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*
Geoffrey Denis Hayday
1 Cedar Drive
Barming
Maidstone
Kent ME16 9HD

Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation
06380125001

4. Title of the invention
Powder dispenser

5. Name of your agent *(if you have one)*
Keith W Nash & Co

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*
90-92 Regent Street
Cambridge
CB2 1DP

Patents ADP number *(if you know it)*
1206001 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*
UK	0312254.6	29/05/03

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
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Continuation sheets of this form	
Description	9
Claim(s)	4 DL
Abstract	1
Drawing(s)	1+1

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Priority documents	
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Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	1 ✓
Request for substantive examination *(Patents Form 10/77)*	1 ✓
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature [signature] Date 18 /02/2004

Keith W Nash & Co., Agents

12. Name and daytime telephone number of person to contact in the United Kingdom

Keith Nash 01223 355477

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C921/H

Title: Powder dispenser

Field of invention

This invention relates to devices for dispensing powder such as talcum powder.

Background

It is known to package talcum powder in a rigid container having a dispensing nozzle at one end having a plurality of small holes therein through which powder can be dispensed by shaking the container, normally in a horizontal or inverted condition.

It is also known to package talcum powder in a flexible walled container also having a similar dispensing nozzle at one end through which powder can be forced by squeezing the flexible wall, whether inverted or upright.

A powder dispenser is described in US Patent Specification 4,730,751 in which a dip tube conveys powder to a discharge plug in a flexible walled container and a multicellular foam pad encases the lower end of the tube for effecting smooth and uniform movement, without clogging, of powder through the tube when the container is squeezed to discharge powder when the container is upright. The device includes air passages which allow air to pass directly to a mixing chamber in the plug and these can be covered by a similar foam pad to prevent clogging when discharging powder while the container is inverted.

Object of the invention

It is an object of the present invention to provide a modification to such powder dispensing containers and nozzles therefor, to allow more controlled dispensing of powder therefrom.

Summary of the invention

According to one aspect of the present invention within or associated with a powder dispensing nozzle of the type having one or more small holes through which powder can be ejected and located in the wall of a container partially filled with the powder which can be dispensed either by shaking or by air pressure caused by squeezing the container, there is provided an intermediate powder reservoir on or in which some of the powder within the container becomes lodged by inverting or shaking the container, such that on subsequently shaking or squeezing the container, to dispense powder therefrom, at least some of the powder lodging in or on the intermediate reservoir is caused to pass through the hole or holes in the nozzle, the intermediate reservoir serving to impede the passage of the remainder of the powder in the container to the nozzle openings if the container is inverted during shaking or squeezing, so that in general during each discharge action, only the powder in or on the intermediate reservoir will exit via the nozzle.

The action of shaking or squeezing the container not only causes powder in the intermediate reservoir to leave the container via the nozzle but can also cause other of the powder in the container to replace at least some of the powder that has left the intermediate reservoir, so that the latter is at least partially replenished during each discharge action and is left ready to discharge another quantity of powder via the nozzle with the next shake or squeeze of the container. Otherwise the reservoir can be replenished by inverting the container briefly.

In one embodiment the reservoir can be likened to, and comprise a filter inserted in the neck immediately below the end nozzle of a plastic powder puffer dispenser.

The filter reservoir may comprise a hollow tube the lower end of which is closed but having a plurality of small holes in at least the wall thereof and possibly also the closed end, or the wall and/or base may be formed at least in part from a woven fabric, such as a woven wire or woven plastics mesh.

The available area of the hollow tube may be increased by corrugating the wall so as to form a concertina shape, as in a car air filter. Alternatively, moulded plastics modules or hairs may be included in the exterior design of the hollow tube, to increase the surface area to which powder can adhere.

Alternatively the filter may comprise a wad of mesh of the type used to construct pan or paint scourers.

The area of the perforated/apertured wall of the tube, or area of the woven mesh material making up the filter, determines the surface area available to entrap the powder. A larger area reservoir filter enables more powder to adhere thereto, or become embedded in the openings in its structure.

According to a preferred feature of the invention the intermediate reservoir may be formed from two filters, one having smaller openings than the other, and the one filter is sandwiched between the nozzle openings on the one hand and the said other filter, the latter serving to hold a charge of powder and the former serving to restrain the volume of powder emitted during a discharge.

According to a further feature of the invention the intermediate reservoir may comprise a foam pad or two foam pads, one having a coarser cell structure than the other, and the finer cell structure pad is sandwiched between the nozzle openings and the coarser cell structure pad, for the same purpose.

The invention is of particular application to dispensers having a flexible resiliently deformable container wall and which are operated by squeezing the wall to force air and powder out. However it can be applied to rigid walled containers where dispensing is achieved by shaking, typically where dispensing by shaking involves inverting the container to do so.

Thus the purpose of the intermediate reservoir is twofold. Firstly when for example squeezing so as to spray powder upwards, powder will have previously adhered to the filter (following for example a prior inversion or shake to charge it), which will be discharged as a single dose upwards. Without the reservoir, all the powder is in the base of the container and often only a negligible amount will be entrained into the airflow created by the act of squeezing the container, to be discharged upwards, unless a dip tube is used which is undesirable since it can become clogged.

The second purpose is to limit the discharge from a nozzle in a container from which powder is dispensed downwardly from an inverted or partially inverted condition. Typically in order to limit discharge rates, the openings in a nozzle intended to discharge downwardly are made very small, but such small openings in the nozzle can easily become clogged when the container is inverted or partially inverted, and squeezed or shaken to dispense powder. By restricting access to the nozzle by the main body of powder in the container (by trapping only some of the powder in the intermediate reservoir from which it can be dispensed) and therefore the rate at which powder can be discharged from the bulk, larger nozzle openings can be employed thus reducing the risk of clogging. Without the intermediate reservoir, excessive amounts of powder can be discharged if the nozzle openings are increased so as to reduce the risk of clogging, unless a foam pad is employed at both ends of the dip tube, adding to the cost and complexity of the dispenser.

Where the container wall is flexible, the dispenser may be inverted or shaken to charge the reservoir, and then squeezed, preferably after rotating it so as to point generally upwardly. The surface area, and therefore powder retention properties, of the reservoir is selected to attract and retain a sufficient charge of powder to be available to be discharged upwards through the nozzle openings when the dispenser is squeezed.

When employed in a rigid walled container where dispensing is to be achieved by inverting and shaking, the intermediate reservoir now additionally serves to restrict the quantity of powder which can reach the nozzle when inverted.

Thus the use of an intermediate reservoir facilitates upward spraying, and can prevent nozzle clogging or excessive powder discharge, when discharging downwards, especially when ejecting powder by squeezing the container.

According to another aspect of the present invention a method of discharging powder such as talcum powder, from a flexible walled container having an outlet nozzle containing a plurality of small openings therein at one end and an intermediate reservoir in which powder can be retained internally of the openings in the nozzle for discharge through the openings, comprises the steps of inverting the container to charge the intermediate reservoir, and thereafter squeezing the flexible container wall to pressurise the contents of the container and force powder in the intermediate reservoir through the openings in the outlet nozzle.

Preferably, prior to squeezing the container, it is rotated into an upright or near upright condition so that powder not retained by the intermediate reservoir falls away from the discharge end of the container so as not to be available to be discharged.

According to a further aspect of the present invention a method of discharging powder such as talcum powder from a rigid walled container having an outlet nozzle containing a plurality of small openings therein at one end and an intermediate reservoir in which powder can be retained internally of the openings in the nozzle for discharge through the openings, comprises the steps of inverting the container to charge the intermediate reservoir, and thereafter shaking the container to discharge the powder retained in the intermediate reservoir through the openings in the nozzle, the intermediate reservoir operating to restrict the discharge of powder during each shake to that retained by the intermediate reservoir during the inversion or each previous shake of the container.

By flexible is intended a container wall which is resiliently deformable by squeezing and will revert to its normal shape when the squeezing force is removed.

The invention will now be described by way of example with reference to the accompanying drawings in which:

Fig 1 is a cut away section through a powder container fitted with a tubular intermediate powder reservoir, and

Fig 2 is a cut away section through a powder container fitted with a mesh which comprises an intermediate powder reservoir.

In Fig 1 a powder container 10 containing a main charge of powder such as talcum powder 12 is provided at its upper end with a dispensing nozzle 14 the upper end of which includes four holes 16 through which powder can be discharged. This is achieved by inverting and/or shaking the container 10. If the wall of the container is resiliently deformable, as by being made from a plastics material, the powder can be discharged upwardly or downwardly by squeezing the wall of the container, so as to force air and powder entrained therein, through the openings 16. If the container wall is not intended to be squeezed, discharge can be obtained by shaking the container in its inverted condition.

In accordance with the invention an intermediate powder reservoir is provided below the nozzle 14. In Fig 1 this comprises a hollow tubular member 18 fitted below the nozzle 14 so as to protrude inside the container. The wall of 18 includes a large number of small holes19. Powder can become lodged in these holes if the container is shaken or inverted, and some powder may pass through the holes into the interior of the tube 18. Whether inside or merely lodged in the holes 19 in the wall of the tube, the latter serves as a reservoir for powder. When subsequently shaken or pressurised by squeezing the container wall, the powder inside the tubular reservoir (or merely in the holes 19) will be forced out through the holes 16.

Where it is not intended that the powder is to be discharged by squeezing the wall of the container, the holes 19 in the wall of the tubular reservoir 18 are preferably larger than if the powder is to be discharged under pressure, so that the act of inverting the container

will cause powder to enter the reservoir 18, through the holes, and the act of subsequently shaking the container will cause the powder in 18 to exit by the holes 16.

The base 20 of the tubular reservoir 18 may be solid so that once powder has entered 18 through holes 19 there is little tendency for it to drop back into the main charge of powder in 10, under gravity, once the container has been stood upright on its base 20.

The cylindrical wall of the reservoir 18 may be formed from a woven fabric-like material such as woven wire mesh, the openings in the fabric or mesh comprising the holes 19, or from a solid material (metal or plastics) which is perforated by small holes 19.

A preferred reservoir is constructed from a perforated foil such as is employed in electric razors, where it is found that the powder becomes lodged in the openings, and may penetrate into the interior of the container formed by the foil, for subsequent dislodgement and exit via the nozzle openings.

Where the reservoir comprises a container the wall of which is perforated with slightly larger holes, the thickness of the container wall may be at least equal to (and preferably is twice or three times) the diameter of the holes 19 in the reservoir wall in order to reduce the chance of powder leaving the reservoir 18 and falling back into the main charge of powder 12.

Where the larger holes are openings in a thinner wall, a hollow tubular protrusion (not shown) may surround each hole and extend internally of the reservoir 18 so as to make it less likely for powder particles inside the reservoir to leave via the holes 19.

Where the holes 19 are protected internally by tubular protrusions, the base of the reservoir 18 (which is otherwise preferably solid) may also be formed with holes, since the upstanding tubular protrusions will also prevent powder which has built up in the base of the reservoir 18 from falling out through the holes in the base at least until the depth of powder is greater than the internal height of the protrusions.

An alternative design of reservoir is shown in Fig 2, where items which are similar to those shown in Fig 1 are denoted by the same reference numerals.

Here item 18 is replaced by a wad of plastic mesh 22 similar to a pan scourer. The act of shaking or inverting the container 10 will cause powder to become trapped in the mesh for subsequent discharge, either with continued shaking or if the container wall is flexible and the wall is squeezed to pressurise the interior of the container.

Where the act of shaking the container to charge the reservoir such as 18 or 22 results in some of the powder escaping prematurely, the openings 16 may be covered with the hand or with a cap such as 24, which is removed before the container is subsequently shaken or squeezed to discharge the powder trapped in the reservoir, through the holes 16.

Although four holes 16 are shown, it is to be understood that irrespective of the design of the intermediate reservoir any number of holes can be employed, either more or less, and a nozzle having only one hole can be used.

Although not shown where the reservoir 18 is moulded from plastics material spikes or hairs which may be integrally formed by moulding from plastics material, may be formed on the surface of the reservoir (both inside and/or outside) to increase the surface area available to which powder can adhere. In addition or alternatively the outer surface may include a grid or gauze or honeycomb-like structure, defining a plurality of openings (pigeon holes) in which powder can become trapped when the container is shaken, (or more preferably, inverted). When the container is subsequently shaken (or where the container wall is flexible, the container is squeezed) the powder trapped in or on the reservoir 18 is discharged through the nozzles, and other powder from within the container is taken up by the reservoir 18 ready to be discharges through the nozzles when the container is shaken or squeezed again.

The tubular reservoir 18 of Fig 1 may be replaced by a cylindrical pad of open cell foamed plastics material, and shaking the container (or squeezing the container wall where it is flexible) will cause powder to enter the cellular structure of the foamed material, such that subsequent shaking (or pressurisation of the container by squeezing the wall thereof) will result in the powder clinging to the cell structure to be forced out through the nozzle openings, and to be replaced by other powder from within the container ready for discharge during the next shake of the container or squeeze of the container wall.

The cylindrical pad of open cell foamed plastics material may be solid or hollow.

Two pads of open cell foamed plastics material may be provided in place of a single pad, the one nearer to the nozzle openings having smaller cell structure than the other, which is separated from the nozzle openings by the foam pad having the smaller cell structure.

Although a mixing chamber in the discharge nozzle (plug) may be advantageous the invention envisages arrangements with or without a mixing chamber and in particular can allow a dispenser to be made without the need for a dip tube to convey powder to the discharge nozzle when discharge is to be effected with the container in an upright condition.

In a further embodiment, not shown, the reservoir comprises a comb-like structure coiled into a spiral or into a helix, with the prongs of the comb pointing towards the region of the container in which the main charge of powder is stored. The prongs each constitute a surface onto which powder will adhere when the reservoir is "charged", and the structure allows for free flow of air from the inside of the container through the nozzle openings when the container wall is squeezed, the air flow serving to entrain some or all of the powder clinging to the prongs.

C921/H

Claims

1. A powder container and dispensing device comprising a powder dispensing nozzle of the type having one or more small holes through which powder can be ejected and which is located in the wall of a container which in use is partially filled with the powder, wherein the powder is dispensed either by shaking the container or by increasing the air pressure in the container by squeezing the latter, characterised by an intermediate powder reservoir on or in which some of the powder within the container will become lodged in use by inverting or shaking the container, such that on subsequently shaking or squeezing the container, to dispense powder therefrom, at least some of the powder lodging in or on the intermediate reservoir is caused to pass through the small hole or holes in the nozzle, and the intermediate reservoir serves to impede the passage of the remainder of the powder in the container to the nozzle openings if in use the container is inverted during shaking or squeezing, so that in general during each discharge, only the powder in or on the intermediate reservoir will exit via the nozzle.

2. A device as claimed in claim 1 wherein the action of shaking or squeezing the container to effect the discharge not only causes powder in the intermediate reservoir to leave the container via the nozzle but also causes other of the powder in the container to replenish the intermediate reservoir, so that the latter is left ready to discharge another quantity of powder via the nozzle with the next shake or squeeze of the container.

3. A device as claimed I claim 1 wherein the intermediate reservoir is replenished by inverting the container.

4. A device as claimed in claim 1, 2 or 3 wherein the intermediate reservoir comprises a filter immediately below the nozzle.

5. A device as claimed in claim 1, 2 or 3 wherein the intermediate reservoir comprises a hollow tube the lower end of which is closed but which has a plurality of small holes in at least the wall thereof.

6. A device as claimed in claim 5 wherein the closed end of the intermediate reservoir is also formed with a plurality of small holes.

7. A device as claimed in claim 5 wherein the wall and/or the closed end of the intermediate reservoir tube is or are formed from a woven fabric such as woven wire or a woven plastics mesh.

8. A device as claimed in claim 5, 6 or 7 wherein the wall of the tube is corrugated so as to form a concertina shape, to increase the surface area containing the small holes.

9. A device as claimed in claim 5, 6 or 7 wherein moulded plastics modules or hairs are included in the exterior design of the hollow tube, to increase the surface area thereof to which powder can adhere.

10. A device as claimed in claim 1, 2 or 3 wherein the intermediate reservoir comprises a wad of mesh similar to that used to construct pan or paint scourers.

11. A device as claimed in claim 1, 2 or 3 wherein the intermediate reservoir comprises two filters, one having smaller openings than the other, and the one filter is sandwiched between the nozzle openings on the one hand and the said other filter, the latter serving to hold a charge of powder and the former serving to restrain the volume of powder emitted during a discharge.

12. A device as claimed in claim 1, 2 or 3 wherein the intermediate reservoir comprises a foam pad.

13. A device as claimed in claim 1, 2 or 3 wherein the intermediate reservoir comprises two foam pads, one having a coarser cell structure than the other, and the finer cell structure pad is sandwiched between the nozzle openings and the coarser cell structure pad, for the same purpose.

14. A device as claimed in any of claims 1 to 13 wherein the container has a flexible wall which in use is squeezed to force air and powder out through the nozzle openings.

15. A device as claimed in any of claims 1 to 13 wherein the container is a rigid walled container and discharge is achieved by shaking, after inverting the container.

16. A device as claimed in any of claims 1 to 15 wherein the container wall is resiliently deformable by squeezing and will in general revert to its normal shape when the squeezing force is removed.

17. A method of discharging powder from a flexible walled powder container having an outlet nozzle containing a plurality of small openings therein at one end and an intermediate reservoir located internally of the openings in the nozzle in or on which powder can be retained for subsequent discharge through the openings, comprising the steps of inverting the container to charge the intermediate reservoir, and thereafter squeezing the flexible container wall to pressurise the contents of the container and force powder in the intermediate reservoir through the openings in the outlet nozzle.

18. A method as claimed in claim 17 wherein prior to squeezing the container, it is rotated into an upright or near upright condition so that powder not retained in or on the intermediate reservoir falls away from the discharge end of the container so as not to be available to be discharged.

19. A method of discharging powder from a rigid walled container having an outlet nozzle containing a plurality of small openings therein at one end and an intermediate reservoir located internally of the openings in the nozzle in which powder can be

retained for subsequent discharge through the openings, comprising the steps of inverting the container to charge the intermediate reservoir, and thereafter shaking the container to discharge the powder retained in or on the intermediate reservoir through the openings in the nozzle, the intermediate reservoir serving generally to restrict the discharge of powder during each shake to that retained by the intermediate reservoir during the inversion or each previous shake of the container.

20. A method as claimed in claim 17, 18 or 19 wherein the powder is talcum powder.

21. Powder dispensers and methods of dispensing powder from containers substantially as herein described and as illustrated in the accompanying drawings.

C921/H

Abstract

A powder container and dispensing device comprises a powder dispensing nozzle of the type having one or more small holes through which powder can be ejected and which is located in the wall of a container which in use is partially filled with the powder. The powder is dispensed either by shaking the container or by increasing the air pressure in the container by squeezing the latte. An intermediate powder reservoir is provided on or in which some of the powder within the container will become lodged in use by inverting or shaking the container. On subsequently shaking or squeezing the container, at least some of the powder lodging in or on the intermediate reservoir is dispensed through the small hole or holes in the nozzle. The intermediate reservoir serves to impede the passage of the remainder of the powder in the container to the nozzle openings if in use the container is inverted during shaking or squeezing, so that in general during each discharge, only the powder in or on the intermediate reservoir will exit via the nozzle. The intermediate reservoir can comprise a filter, which has a plurality of small holes in at least the wall thereof. The wall and/or the end of the hollow tube may be formed from a woven fabric such as woven wire or a woven plastics mesh, and the wall of the tube may be corrugated so as to form a concertina shape, to increase the surface area containing the small holes, or the exterior of the hollow tube may include moulded plastics modules or hairs, to increase the surface area to which powder can adhere, or the intermediate reservoir may comprise a wad of mesh similar to that used to construct pan or paint scourers, or a foam pad, or two foam pads, one having a coarser cell structure than the other, in which the finer cell structure pad is sandwiched between the nozzle openings and the coarser cell structure pad. The container typically has a resiliently deformable flexible wall which in use is squeezed to force air and powder out through the nozzle openings.

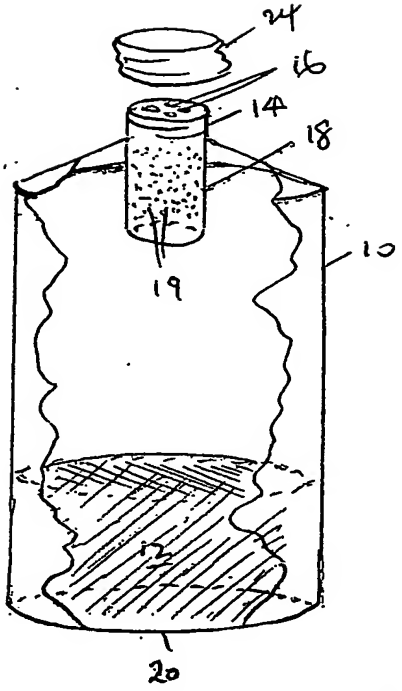

Fig 1

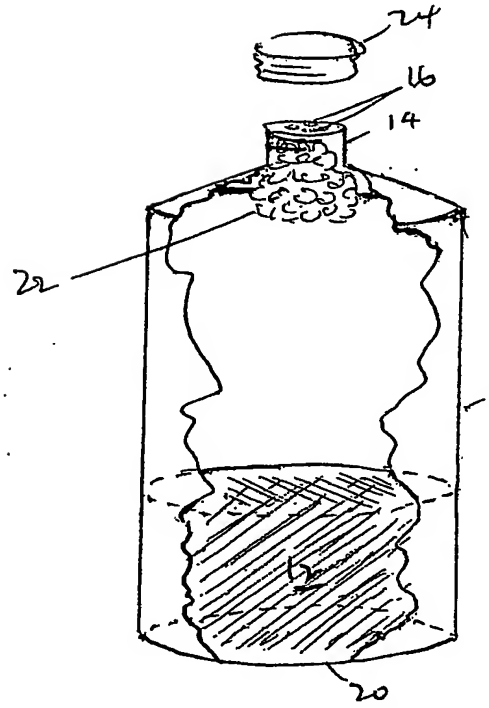

Fig 2

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